To be published in Southeast Asian Journal of Social Science, 1976.

ACTIVITY SYSTEMS AS AN URBAN RESEARCH METHOD*

by

Y. M. Yeung

International Development Research Centre

Economic reasoning and the free market mechanism have been relied upon to such a considerable extent as theoretical underpinnings in urban research methods that, Chapin maintains, the search for alternative conceptual frameworks is more often than not stifled.[1] The use of time as a complementary explanatory variable in urban research has been only recently tapped. Similarly, in the planning and provision of urban functions and services, the urban planner has been so obsessed with land use and physical development planning that MacMurray contends that time as a measure of the environmental dynamic has to date been almost totally neglected.[2] It is the object of this paper to conjoin the recent convergence of interest in time and activity systems research, highlighting some of its potentialities and pitfalls, as well as to present some preliminary findings of a time-budget survey of public housing residents in the Republic of Singapore.

Activity Systems Research

Detailed accounting of human activity patterns using time as an independent variable is a popular and well accepted social science and planning research methodology in Europe for more than 70 years.[3] Despite its sporadic

---

*This paper was read at the Thirteenth Pacific Science Congress, Vancouver, August 18-30, 1975, in the session called "The Theory and Study of Urbanization in Developing Countries of the Pacific Region" organized by Dr. T.G. McGee. The views expressed in this paper are solely the author's and do not necessarily coincide with those of the International Development ResearchCCentre. Grateful thanks are extended to the Research and Statistics Department of the Housing and Development Board for the assistance in processing the data for this paper.

1 F.S. Chapin, Jr., "Activity Systems and Urban Structure: A Working Scheme," Journal of the American Institute of Planners, 36 (January, 1968),pp. 11-18.

2 T. MacMurray, "Aspects of Time and the Study of Activity Patterns," Town Planning Review, 42 (1971), pp. 195-209.

3 See A. Szalai, "Trends in Comparative Time-Budget Research," American Behavioral Scientist, 10 (1966), p. 3-8 and MacMurray, op. cit.

application since, it was by and large in the last decade when activity systems-time budget studies began to attract increasing urban research interest. The recent upsurge of research interest in this field may be attributable in part to the increasing possibilities of building viable theoretical constructs supplementary to established theories and in part to the gradual adoption of behavioural orientations in certain social science disciplines. More specifically, Szalai pinpoints five factors for the particular relevance and promising utility of activity systems research in contemporary societies as a result of changes and innovations in technology and life styles.[4]

A comprehensive survey of the literature is beyond the scope of this short paper. However, a summary of the major works may be attempted. Szalai, the principal investigator of a recently completed, massive multi-country comparative time-budget study, has through a series of published works done much to popularize the time-budget methodology and to draw attention to its scope in cross-cultural analysis.[5] His latest work represents the culmination of these efforts.[6] Equally significant are the exploratory attempts of Chapin who, perhaps more than anybody else, has raised and amplified various substantive theoretical and

---

4 A. Szalai, "The Multinational Comparative Time Budget Research Project: A Venture in International Research Cooperation," American Behavioral Scientist, 10 (1966), p. 5.

5 See, for example, A. Szalai, "Differential Evaluation of Time Budgets for Comparative Purposes," in R. L. Merritt and S. Rokkan (eds.), Comparing Nations: The Use of Quantitative Data in Cross-National Research (New Haven: Yale University Press, 1966), pp. 239-58; "Trends in Comparative Time-Budget Research", op.cit.; and "The Multinational Comparative Time Budget Research Project," op. cit.

6 A. Szalai et al., The Use of Time (The Hague: Mouton Publishers, 1972).

methodological uissues associated with activity systems research.[7] His overall concern has never deviated from the objectives of identifying and efficiently quantifying activity patterns and how these can be brought to bear on an improved understanding of urban land use and the spatial organization of the city. Substantial contributions in methodological refinement in urban research and policy formulation are envisaged. Chapin's latest treatise represents a summation and an expansion of his early endeavours.[8] The specific nature and potential values of activity studies in urban research and urban planning are addressed to by Anderson,[9] MacMurray,[10] and Gutenschwager,[11] At a more general level, Anderson also extends his notions on the interrelated nature of time and space to suggest how space-time reorganizations and temporal solutions may provide answers to some of our seemingly specific spatial urban problems.[12] ..... (run on) .....

---

7 See F.S. Chapin, Jr., "Activity Systems," op. cit. and "Free Time Activities and Quality of Urban Life," Journal of the American Institute of Planners, 37 (November, 1971), pp. 411-17; F.S. Chapin, Jr, and H.C. Hightower, "Household Activity Patterns and Land Use," Journal of the American Institute of Planners 31(August, 1965), pp. 222-31 and Household Activity Systems: A Pilot Investigation (Chapel Hill: Center for Urban and Regional Studies, University of North Carolina, 1966); F.S. Chapin, Jr. and T.H. Logan, "Patterns of Time and Space Use," in H.S. Perloff (ed.), The Quality of the Urban Environment (Baltimore:Johns Hopkins Press, 1969), pp 305-32; and R.K. Brail and F.S. Chapin, Jr., "Activity Patterns of Urban Residents," Environment and Behavior, 5 (1973), pp. 163-90.

8 F. S. Chapin, Jr., Human Activity Patterns in the City: Things People do in Time and Space (New York: John Wiley and Sons, 1974).

9 J. Anderson, "Space-Time Budgets and Activity Studies in Urban Geography and Planning," Environment and Planning, 3 (1971), pp. 353-68.

10 MacMurray, op. cit.

11 G. A. Gutenschwager, "The Time Budget-Activity Systems Perspective in Urban Research and Planning," Journal of the American Institute of Planners, 36 (November, 1973), pp. 378-87.

12 J. Anderson, "Living in Urban Space Time," Architecture Design, (January, 1971), pp. 41-44.

Departing somewhat from the main stream of activity studies, Godschalk and Mills advocate a more informal method, in what they term a collaborative approach to urban planning, to study urban activities with a view to eliciting maximum community participation in the planning process.[13] Finally, Holman shows that the changing of way of life of a nation is mirrored in a national time-budget and Kranz proposes a word-oriented, four-digit coding system to cope with the thorny problem of activity classification and computerization.[14]

The growing interest in activity systems research is a reflection of the realization that in modern societies time is as much a constraining factor in the choice and performance of human activities as income, friction of distance, and other variables. Like any other factor, time can be viewed as an expendable resource, andindependent variable to study the preference patterns of human activities within the constraints of situational properties and value systems. Men are engaged in certain activities, sometimes out of choice and sometimes dictated by circumstantial and environmental causes. Thus, the essence of the analytical effort in activity studies is to sort out the preferences and constraints in relation to activity patterns.

Activity systems may be defined as "behavior patterns of individuals, families, institutions, and firms which predispose to distribution in space."[15] They have therefore a wide range of applications although many activity studies to date have focused on life styles and in applied evaluative work of mass media. Meier and Hitchcock have also shown how indices can be constructed and used as

---

13. D. R. Godschalk and W.E. Mills, "A Collaborative Approach to Planning through Urban Activities," Journal of the American Institute of Planners, 32 (March 1966), pp. 86-95

14 M.A. Holman, "A National Time-Budget for the Year 2000," Sociology and Social Research, 46 (1961) pp. 17-25 and P. Kranz, "What do people do all day?" Behavioural Science, 15 (May, 1970), pp. 286-91.

15 Chapin and Hightower, 1965, op. cit., p. 223

the basis for evaluating government programmes.[16] In addition, Chapin and Logan underscore in activity studies an especially attractive possibility in linking up planning formulation, policy making, and political action at the metropolitan level.[17] Lastly, since activity patterns are in large measure behaviour patterns, the opportunities they provide in placing human activitiies in an overall behaviour context are considerable.[18] Observed spatial and time-based behaviour is obviously subject to the influence of environmental constraints, but many activity routines can thus be viewed realistically and in explanatory terms.

Despite the theoretical possibilities inherent in activity systems research, putting these into operational terms is a daunting and, in some cases, yet to be overcome problem. Methodologies that have been applied are largely descriptive in nature, requiring a thorough understanding of the value system of the people under study. For this reason, data from activity studies can rarelybbe taken at their face value. Among the practical problems confronting the researcher in activity studies is the apparently irreconcilable objective of keeping in the analytic framework as much of the details of human activities as possible and of summarizing these activities in a manageable number of activity classes for easy computerizaton. There are, moreover, other methodological problems such as overlapping activities, choice of time frames, use of control variables, and others, which willnnot be dealt with here.

---

16 R. L. Meier, "Human Time Allocation: A Basis for Social Accounts," Journal of the American Institute of Planners, 25 (1959), pp. 25-33 and J.R. Hitchcock, "Daily Activity Patterns: An Exploratory Study," Ekistics, 23 (1972), pp. 323-27.

17 Chapin and Logan, op. cit., p. 307

18 Anderson, "Space-Time Budgets," op. cit.

The Data and Analysis

The data on which this paper is based are derived from a time-budget survey of residents in a sample of public housing estates in Singapore undertaken in April 1973. The survey covered 592 individuals with 277 males, 115 of whom were below 20 years of age, and 315 females, 99 of whom were younger than 20 years old. They were sampled from five housing estates under the management of the Housing and Development Board (HDB), the statutory board in charge of public housing and other national development programmes in Singapore. Concerned with the activity patterns of residents over 10 years of age, the survey adopted the "yesterday interview" method. The questionnaire consisted of a detailed enumeration of activities in a full 24-hour schedule of a weekday and Sunday, seeking parallel information on "what", "where", "how long", and "with whom" the activities took place.

The bulk of the survey results has been reported elsewhere using the duration of time expenditure among activity classes as the basis of analysis.[19] Activity data also can be analyzed with respect to their sequence, synchronization, and frequency, among others. What is presented here are data which indicate comparative rates of participation of the sample population in the different activity classes employed. Whereas the earlier reporting focused more on the overall time budgets, sleeping and rising time habits, mass media utilization, and locational and personal associations, the present paper concentrates on only three variables, namely occupation, flat size, and age group, in an attempt to shed additional light on the life style of public housing in Singapore.

---

19 Y.M. Yeung and S. Yeh, "Life Styles Compared: Squatters and Public Housing Residents," in S. Yeh (ed.), Public Housing in Singapore: A Multi-Disciplinary Study (Singapore: Singapore University Press, 1975), pp. 302-24.

Duration of time allocation to the various activities on the basis of the three variables has been tabulated and analysed. It was found that the results were too crude and too similar to show any significant difference in the activity patterns. Consequently, the rate of participation of respondents in the various activities was used as another method of analysis and, indeed, the results point to some interesting differences in activity patterns and activity routines, although not uniformly different when population classes are considered in the framework of the three selected variables.

To begin with, it is significant to repeat Chapin and Logan's observation that time-budget data are usually noted more for their homogeneity than for their heterogeneity.[20] In their overt form, daily activities of the various population cohorts do display a high degree of resemblance. This is all the more true of activities such as work, sleep, meals, shopping, personal care, and the like, which can be classified as activities of an obligatory nature.[21] Some activities, notably sleep, are particularly inelastic since they are governed by physiological needs and hence would hardly vary between days of the week, sex, and other variables.[22] For these reasons, meals and sleep are two activity classes which have been excluded from the present analysis inasmuch as everybody participates in these activities. It is, however, the small differences in time allocation on which the details of different activity routines may be revealed and on which guidelines for policy formulation or policy revision may be provided.

---

20 Chapin and Logan, op. cit., p. 316

21 Brail and Chapin, 1973. op. cit.

22 See Szalai, "Differential Evaluation," op. cit., and for empirical results in Singapore, see Yeung and Yeh, op. cit.

With these reservation in mind, Tables 1 and 2 indicate that public housing residents considered by different occupational groups have indeed more in common than in difference in their degree of participation in the various daily activities. When weekday-Sunday patterns are compared, there is a marked decrease in the proportion of respondents working on Sundays and, consequently, in lost time in going to work or other out-of-home activities. Conversely, on Sundays, the rate of participation, regardless of occupational groups, increases clearly in household work, shopping, and leisure activity. The only activities with varying rates of participation of note across occupational groups are the discretionary activities, as shown in the last few rows starting with television. Respondents belonging to the professional and administrative group, for example, are slightly more likely to be engaged in television viewing than those in the clerical and craftsmen groups. A somewhat reverse pattern is observable between these occupational groups in social intercourse, especially weekdays.

It has been observed that flat size by the number of rooms is an important variable which differentiates the economic well-being, income level, and other socio-economic characteristics of Singapore's public housing residents.[23] In an attempt to verify this hypothesis, time-budget data were tabulated to examine if any significant differences existed in activity patterns. Again, the picture which emerges from Tables 3 and 4 is one of overwhelming similarity rather than disparity, in the degree of participation of various activities by the respondents based on the size of the flat they live in. As in the data presented for occupational groups, there are anticipated

---

23 H.M. Tham, "Economic Characteristics of Residents of Housing Development Board Flats in Toa Payoh" (Unpublished Academic Exercise, Department of Economics, University of Singapore, 1968) and S.H.K. Yeh and Statistics and Research Department, HDB, Homes for the People: A Study of Tenants' Views on Public Housing in Singapore (Singapore: Government Printing Office, 1972).

changes in the rate of participation between weekdays and Sundays. A noteworthy feature of the distribution is that when the rate of participation changes for respondents in one type of flat, similar changes are recorded for other population groups. Thus, from weekday to Sunday the rate of participation declines in sympathy in productive work, school, and lost time across analyzed categories, and rises in like manner in household work, shopping, leisure activity, and social intercourse. Nevertheless, significant between-group variations in the rate of participation can be discerned in study/reading and social intercourse (both weekday and Sunday) and television (weekday only). It is plausible that some of these differences can be ascribed to general physical factors of varying space availability in the household, which may account for the notably smaller proportion of the respondents in one-room flats engaged in study/reading. This is, in essence, the conclusion of the earlier reporting, in which environmental factors were given credit in explaining differences in activity routines.[24] Equally plausible, though, the differences may be the result of initial variations in the socio-economic factors of households income, family structure, and others not accounted for in the data presented.

When the rate of activity participation is studied by age breakdown, it becomes readily apparent in Tables 5 and 6 that apart from the weekday-Sunday shifts as observed before, the largest between-group variations are discernible. Some very large differences in participation rates on the basis of age are expected, such as the low rates for the very young in productive work and their high rates in school. The high proportion (44.3 per cent) of the 13-20 age group in productive work on weekdays is somewhat surprising given existing laws against child labour. The inference that may be drawn is that once the mandatory threshold age of sixteen is passed or

---

24 Yeung and Yeh, op. cit.

upon completion of secondary school education,a very large proportion of the youthful joins the labour force. The high rate (88 per cent) of participation in school in the 10-12 year group onwweekdays is simply a reflection of the successful enforcement of almost universal primary education. In a similar fashion, further marked between-group differences in ratesoof participation may be observed in almost every other activity class. Closer examination of the pattern of between-group differences suggest that the different age groups may be grouped by their comparable rates of participation into four groups. The first group comprises the respondents in 10-20 years, with the rest of the age cohorts distinguishable into another three groups: 21-29 years, 30-49 years, and 50 years and above. These categories of regrouped age cohorts are only approximate but they do represent a higher degree of generalization than the original ten age cohorts. The boundaries between one group and another are not always clear. This is particularly the case in the 21-29 year grpup which sometimes merges with either of the two neighbouring regrouped cohorts.

These significant between-group variations in participation rates suggest clearly that of the three variables under consideration, age is the most sensitive one in differentiating activity patterns among the respondents. Additionally, overall rates of activity participation may give more clues to the life style of these people.

Examined by the rows, for instance, it is evident that public housing residents of most age cohorts make use of the educational facilities (indicated by school[25]) provided by the city to improve themselves, most notably on weekdays. This is in sharp contrast to the activity pattern

---

25 School is defined as activities involving learning of any kind in formal classroom situations.

revealed in another time-budget study of an urban-fringe squatter community in Singapore in which no adults of over 21 years old attended schools of any kind.[26] A study of the discretionary activity classes casts further lightson the general life in these housing estates. While the overall high degree of participation of people in all age cohorts in study/reading, on both weekdays and Sundays, is indicative of a high rate of literacy of the population at large, the generally over 30 per cent of the respondents engaged in leisure activity on Sundays may be interpreted as a healthy social indicator. In addition, if there is one single activity which critically conditions the recreation patter of the residents, it is undoubtedly television, which, on Sundays engages for the most part the time of over 60 per cent of the respondents. In two age cohorts even over 80 per cent of the respondents participated in this activity. By comparison, radio listening is a poor contender in engaging the time of the sample population. Quite clearly, the new visual mass medium has overtaken the more traditional audio form. Organizational activity is not a particularly popular activity, even on Sundays, for people in most age cohorts. It may be that public housing residents would prefer their activities to be centred around their immediate family or their kinship network. Alternatively, it may be inferred that organizational activities in the estates and elsewhere in general have much scope for expansion and improvement.

Conclusion and Discussion

The foregoing brief if not also a little simplistic analysis does bespeak similar as well as varied patterns of activity routines across population cohorts of the people under study. It has provided perhaps only tantalizing glimpses of the way of life of public housing residents in Singapore. But more important, it is intended as illustrative of a mode

---

26 Yaung and Yeh, op. cit.

of analysis which, if guided by certain hypotheses or preconceived notions of how different population cohorts should respond in activity participation, can be employed to generate pointers for policy evaluation and programme assessment. If, for instance, in the hypothetical situation in which an unusually low proportion of school-going children is found in schooling, educational authorities should begin to investigate whether parents are keeping their children for work or merely through neglect, if there is a school drop-out problem out of the ordinary, or if some other problems exist. Or, using the example of the actual rates of participation in organizational activities in the above analysis, the concerned planning body may follow up to enquire if the rates recorded are in fact comparable to those prevailing in other housing estates and in other parts of the city area. Should obvious disparaties reveal themselves, remedial course of action is necessary. In theory, at least, any implementing or planning agency charged with certain specified responsibilities can evaluate the success of their existing programmes or plan for new ones using an activity study of the kind sketchily described here. Needless to say, the activity classification and research methodology will have to be tailored to specific needs of the study.

Implicit in many of the interpretative statements arising from the analysis was the assumption of causation. Deliberate attempts were made to seek explanations for activity patterns identified. It is here where prudent caution is especially called for. Using again the example of the seemingly low rate of participation in organizational activities, it may be due to a multitude of causes ranging from lack of interest on the part of the residents to poor programmes themselves and physical deficiencies in location, facilities, and other factors. To say that the low rates are a consequence of any of the possible causes without independent verification is to allow oneself the liberty

of random choices. When activity analysis is used for programme evaluation, in particular, Chapin and Logan draw a warning that alternative explanations must at all times be proffered before the true cause is identified.[27] Otherwise, the use of "misleading partial knowledge" may do programmes under review irreparable harm.

Although activity systems analysis of thekind discussed in this paper may provide tentative suggestions for evaluating action programmes, it is only where time-apace data are jointly gathered and analyzed that the greatest contribution to urban research and urban planning can be made. Thus, Anderson has summarized the promising prospects of time-space budgets as a research field for geographers and planners, and concluded that one of the fundamental and continuing tasks of planning is to make urban structure more responsive to the activity patterns of urban residents.[28] Chapin echoes the same sentiment when he states: "Planning agencies have jumped directly into land use studies, essentially studying the effects of activity system rather than seeking to define and understand activities themselves as producers of land-use patterns".[29]

All this perhaps re-affirms the position taken at the beginning of this paper, that is, there has lately been a definite convergence of research interest in activity studies in spite of relatively little promise of independent postulates to vie with long established urban theories. Formidable conceptual and methodological problems are yet to be solved and policy-makers are yet tobebe convinced of the efficacy of this research paradigm, but as an urban research method activity systems analysis has been drawing an ever increasing number of adherents.

---

27 Chapin and Logan, op. cit., p. 332

28 Anderson, "Space-Time Budgets," op. cit., p. 361

29 F.S. Chapin, Jr., Urban Land Use Planning (Urbana: University of Illinoi